



5 – Stormwater Management Summary



To: Michael Fager, Chair
Somerville Conservation
Commission
Somerville City Hall
93 Highland Avenue
Somerville, MA 02143

Date: February 18, 2022

Memorandum

Project #: 08518.05

From: Peter Mara, P.E.

Re: Block 7A, Notice of Intent
Assembly Row at Assembly Square
Somerville, Massachusetts
Supplemental Memo

This memorandum summarizes the stormwater management system for the proposed Block 7A of the proposed redevelopment of the Assembly Square area in Somerville, Massachusetts, originally presented in the Assembly on the Mystic Proposed 72-inch Storm Drain and Outfall Notice of Intent (NOI) dated November 21, 2008 and issued an Order of Conditions on May 8, 2009. The stormwater management system design remains generally consistent with the stormwater management plan outlined in the previous site plan filings with the City of Somerville Planning Board and Conservation Commission.

As shown on the attached site plans titled "Block 7A" dated February 18, 2022, the proposed building, landscape areas, sidewalks and utility associated infrastructure are in the area of Block 7A and contain less impervious areas than the approved master plan. The drainage patterns of Block 7A are essentially unchanged from the August 11, 2011 Roadway NOI submission. As Described in the Roadway NOI, the overall site plan was modified to address design developments since the issuance of the Order of Conditions while maintaining the originally proposed redevelopment program. The modifications included alterations to the site circulation, minor amenity area reconfiguration, and site grading which had direct benefits to the stormwater management system design and function.

With the proposed interim parking lots and associated drainage system additions, the overall stormwater management system for the entire PUD area will continue to maintain peak flows at or below those described in the November 2008 NOI while providing 1-inch water quality treatment in accordance with the Massachusetts Stormwater Handbook as described in the original Outfall NOI Report. Drainage area maps for proposed conditions, Water Quality Unit (WQU) sizing and Total Suspended Solids (TSS) removal calculations are attached.

Hydrologic Analysis:

Proposed Conditions

All stormwater runoff from the Block 7A will be routed through a series of catch basins with deep sumps and oil/debris traps, proprietary separators and drainage pipe networks on-site and in the right-of-way prior to discharging to the 72-inch outfall (Design Point 6). The stormwater runoff generated by the roof of the Block 7A building is collected by several roof drains that connect directly into the existing drain lines within Foley Street and Revolution Drive, through the roadway system that eventually discharges to the 72-inch outfall. This runoff pattern is generally unchanged from the November 2008 NOI, though the layout of the roadways has been revised slightly and

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the Partners Office project has been included instead of the IKEA project on Parcel 11A. An updated version of the previously presented Table 2 provides a summary of the proposed conditions hydrologic data.

Table 2
Proposed Conditions Hydrologic Data

<i>Description (Drainage Area #)</i>	<i>Discharge Location</i>	<i>Design Point</i>	<i>Area (acres)</i>	<i>Curve Number</i>	<i>Time of Concentration (min)</i>
R-1	Existing swale/depression	4	0.5	88	2.8
O-1	New 72-inch Outfall	6	63.5	95	16.2
S-9	Overland to Mystic River	5	1.8	82	11.5
M-1	84-inch SMC	1	9.6	95	5.3
M-2	84-inch SMC	1	10.7	97	11.6
M-3	84-inch SMC	1	<u>2.5</u>	95	4.9
Total:			88.6		

A revised hydrologic analysis was conducted for the site based on the input parameters described above. As in the previous submission, the rainfall-runoff response of the Site under existing and proposed conditions was evaluated for storm events with recurrence intervals of 2, 10, 25, and 100-years. Rainfall volumes used for this analysis were based on the Natural Resources Conservation Service (NRCS) Type III, 24-hour storm event for Middlesex County. Runoff coefficients for the existing and proposed conditions were determined using NRCS Technical Release 55 (TR-55) methodology as provided in HydroCAD.

Drainage areas used in the analyses are represented above and are depicted on the attached Figures 1 and 2. Figure 1 is unchanged from the November 2008 report. Table 3 presents a summary of the existing and proposed conditions peak discharge rates.

Table 3
Peak Discharge Rates (cubic feet per second)

Design Point	2-year	10-year	25-year	100-year
Design Point 1: MWRA 84-inch SMC				
Existing	117.8	172.1	206.9	249.2
Proposed	58.8	86.6	104.4	126.0
Design Point 2: Mystic River (42-inch culvert)				
Existing	2.0	2.1	2.1	2.2
Proposed	0.0	0.0	0.0	0.0
Design Point 3: Existing Swale/CBs				
Existing	1.3	2.1	2.7	3.3
Proposed	0.0	0.0	0.0	0.0
Design Point 4: Existing Swale/CBs				
Existing	1.3	2.2	2.7	3.4
Proposed	1.3	2.2	2.7	3.4
Design Point 5: Mystic River (Overland)				
Existing	29.7	50.4	63.9	80.5
Proposed	2.7	4.8	6.2	7.9
Design Point 6: New 72-inch Outfall				
Existing	0.0	0.0	0.0	0.0
Proposed	138.0	205.1	247.9	300.0

The revised stormwater management system analyses indicate that there will be a net improvement in terms of the peak rate of discharge and volume of runoff resulting from the site design modifications while maintaining the previous design intent in accordance with the Massachusetts Stormwater Handbook.

Water Quality

The revised stormwater management system provides the required treatment for a 1-inch water quality volume as required. The previously proposed treatment trains for all design points have been maintained. Water quality calculations are proved in Appendix A of the memorandum.

Water quality treatment for Block 7A runoff consists of an operation and maintenance program for water quality measures, a construction phase spill prevention plan and water quality units.

Operation and Maintenance (O&M) Program

A detailed Stormwater O&M program has been prepared for the Project. This plan includes detailed inspection criteria and identifies the responsible parties for implementing the program. In summary, The City of Somerville will be responsible for the maintenance and operation of the street drainage system, including street sweeping, catch basin and manhole cleaning, and maintenance of the street related structures. Federal Realty will be responsible for the maintenance and operation of the Block 7A stormwater management systems including inspection, cleaning and maintenance of the drainage structure, and water quality unit on the site. The maintenance and operation of the 72-inch stormwater outfall, associated tide gate and outfall erosion control measures will be the responsibility of the City of Somerville, in accordance with their EPA NPDES MS4 general permit that covers all stormwater outfalls in the City.

Spill Prevention

A spill prevention and control plan is an important BMP to help minimize potential sources of pollution to ground and surface waters both during construction and as part of the long term operation and maintenance measures of a development. Spill prevention is achieved with the proper storage and handling of hazardous materials. During construction, this is addressed in the Stormwater Pollution Prevention Plan (SWPPP) for Construction Activities to be prepared and implemented by the Site Contractor. The general response procedures for spills at any time are outlined in Chapter 8 of the Final Environmental Impact Report (FEIR) which includes a spill response procedure form, a sample hazardous waste/oil spill report, an emergency response equipment inventory and an emergency notification phone numbers form. The

Catch Basins with Sumps and Oil/Debris Traps and Trench Drains

The Project proposes catch basins within the proposed driveway alley as well as an additional catch basin in Revolution Drive. The catch basins will have deep sumps and hoods, and connect to the existing drainage infrastructure where the collected stormwater runoff will pass through a series of closed pipes, proprietary separators, and drainage structures before the 72-inch outfall.

Water Quality Units

The proposed Stormceptor 450i water quality unit serves as treatment for runoff from the Block 7A valet drive and parking garage entrance, prior to discharge to the 72-inch outfall. The stormwater runoff from Block 7A paved areas that drain to the proposed proprietary separator receives TSS and oil removal through these proprietary separators. Proprietary units are key features for TSS removal within dense ultra-urban brownfield redevelopment settings where space is a limiting factor for placement of alternative large scale surface BMPs.

The Contech Vortechs Units throughout the PUD roadways efficiently remove TSS and free oil from the stormwater runoff, including the runoff generated by the Block 7A sidewalks and roof prior to discharging to the 72-inch outfall on the Mystic River. The units prevent the re-suspension of settled material, and allow for safe and easy removal of collected undesirable material.

The water quality units will be inspected four times per year and cleaned a minimum of once per year, or when the sediment depth reaches within six inches of the dry weather water surface elevation.

Compliance with Massachusetts Department of Environmental Protection (DEP) - Stormwater Management Standards

As demonstrated below, the proposed Project fully complies with the DEP Stormwater Management Standards.

Standard 1: No New Untreated Discharges or Erosion to Wetlands

The stormwater runoff tributary to the existing 72-inch outfall will receive water quality treatment in conformance with the Best Management Practices outlined in the Stormwater Management Performance Standards and Guidelines. The Block 7A redevelopment will result in improvements to the quality of stormwater discharged from the Project Site. These improvements will be achieved by a combination of structural and non-structural Best Management Practices (BMPs) implemented at the Project Site such as regular pavement sweeping and litter control program, installation of deep-sump catch basins with oil/debris traps and water quality structures. Outfall erosion protection sizing computations were provided in the November 2008 NOI.

Standard 2: Peak Rate Attenuation

The overall Project results in either no increase or a reduction in the peak discharge rate for the 2, 10, 25, and 100-year storm events for Design Points 1 through 5 (DP-1 – DP-5). Design Point 6 (DP-6) is a new design point for the existing 72-inch outfall which is not present under existing conditions. Since there are no existing flows at this design point, the post-development flows are shown as an increase from existing conditions. However, because the stormwater is discharging into the tidal portion of the Mystic River it is not necessary for post-development peak discharge rates to be equal or less than those in pre-development as outlined in Standard 2 of the Massachusetts DEP Stormwater Management Regulations. The revised peak discharge rates to DP-6 included in Table 3 of this report are less than those presented in the November 2008 NOI, as required by Condition 62 of the May 8, 2009 Order of Conditions. The use of bioretention, subsurface detention and an upgraded drainage system contribute to a peak rate reduction. Appropriate measures are incorporated to protect against surcharging the system by use of a tide gate and against erosion and turbidity using riprap protection at the outlet. Although this is a new outfall, a large majority of the stormwater

discharging at this outfall is not newly generated but is rerouted from the Somerville Marginal Conduit which also discharges below the Amelia Earhart Dam in the tidal portion of the Mystic River.

Standard 3: Stormwater Recharge

The pre-development condition of the Project Site was almost completely impervious and little if any infiltration existed. Also, soil on the Project Site is contaminated, compacted fill material, or poor quality material which makes it unsuitable for infiltration. Additionally, there are no drinking water supplies on or near the Project Site that require recharge. Finally, the Project is located at the terminus of the Mystic River and therefore any infiltration on the site is an insignificant portion of the flows that are supplying the river.

Standard 4: Water Quality

The Project Site is a dense ultra-urban redevelopment on a brownfield site. However, water quality treatment for runoff from the Project Site was designed to meet or exceed the goal of 80 percent TSS Removal. TSS Removal worksheets are included in Attachment A of this memorandum. Due to the urban nature of the Project and the goal for maximizing dense development opportunities, water quality treatment techniques consistent with urban area constraints were selected.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

The Project site is a brownfield site which is a LUHPPL. Stormwater management BMP's have been selected and designed to comply with this standard. Under existing conditions infiltration is not currently significant at the Project Site and as described above infiltration is not recommended or proposed. Water quality units, bioretention basins, and extensive operations and maintenance requirements address the concerns for LUHPPLs. Minimal surface parking is included on the Project Site with the majority of vehicle parking located in covered garages as part of future Project phases, therefore reducing the effect of the LUHPPL's impervious area to a level of typical roadways.

Standard 6: Critical Areas

The existing MWRA 84-inch SMC and 72-inch outfall will discharge to a "Prohibited" shellfish growing area. Stormwater discharging to this area is treated for 1-inch of runoff and will utilize the applicable stormwater management BMPs approved for critical areas.

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the Maximum Extent Practicable

The Project, while a redevelopment project as defined by the regulations, fully complies with all applicable stormwater standards. The proposed stormwater management system improves water quality and reduces flow to the frequently surcharged MWRA 84-inch SMC by reducing peak stormwater runoff from the Project Site.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Controls

The Project will disturb greater than 1 acre of land and is therefore required to obtain coverage under the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit. As required under this permit, a Stormwater Pollution Prevention Plan (SWPPP) will be developed and submitted before land disturbance begins. Recommended construction period pollution prevention and erosion and sedimentation controls to be finalized in the SWPPP are unchanged from the November 2008 NOI.

Standard 9: Operation and Maintenance Plan

Recommended practices for operating and maintaining long term stormwater BMPs are unchanged from the November 2008 NOI.

Standard 10: Prohibition of Illicit Discharges

Sanitary sewer and storm drainage structures remaining from previous development which are part of the redevelopment area will be removed or will be incorporated into updated sanitary sewer and separate stormwater sewer systems. The design plans submitted with this report have been designed so that the components included therein are in full compliance with current standards. No statement is made with regard to the drainage and sanitary sewer systems in portions of the site not included in the redevelopment project area. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges.

Conclusion:

The Stormwater Management Plan presented herein and as shown on the plans provides functionality for Block 7A while maintaining previously submitted design elements and intent. The proposed modifications include Best Management Practices for maintaining stormwater runoff quality both during and after construction, and are designed to protect downstream receiving waters from stormwater related impacts.

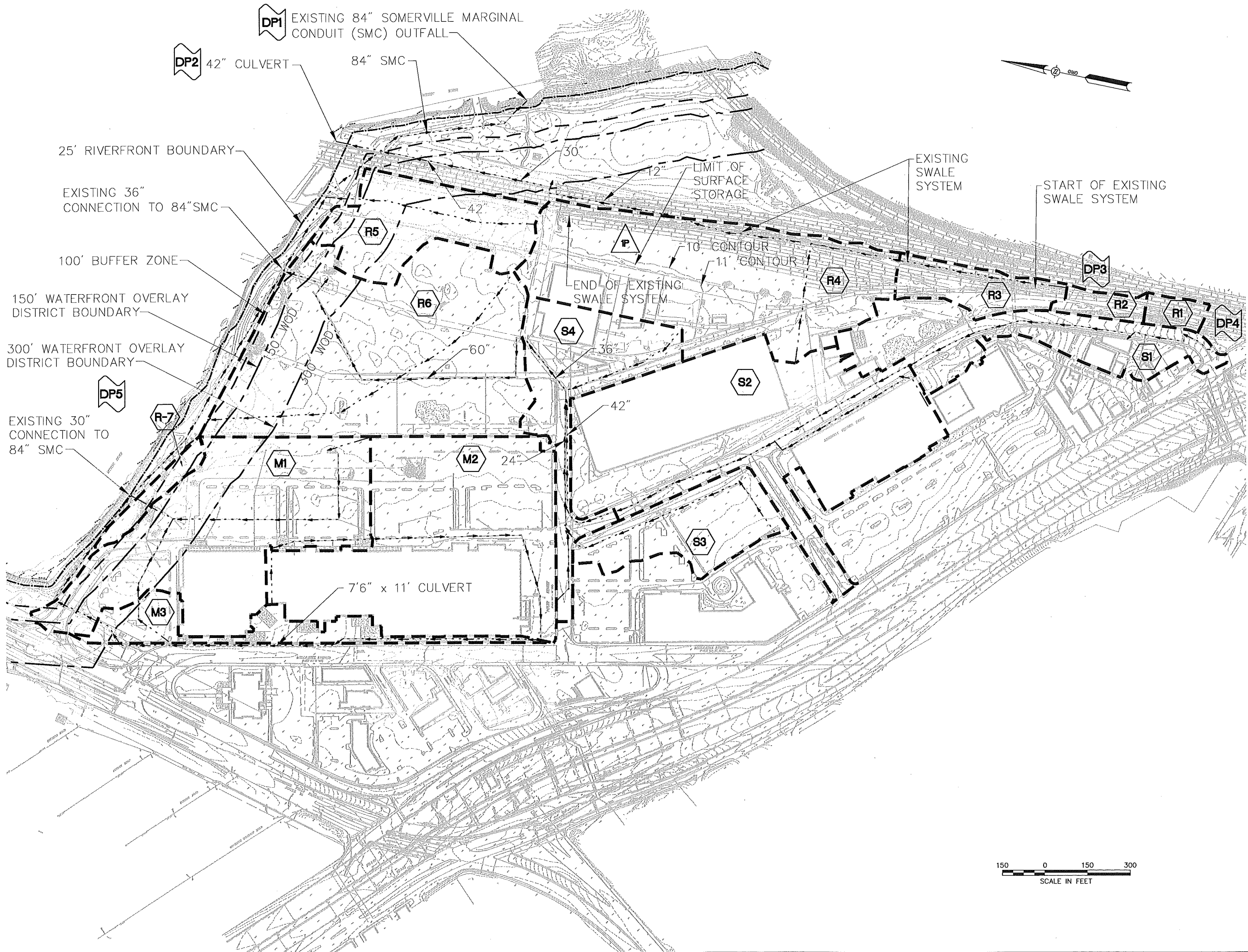
Appendix A

Computations and Supporting Information

- Figure 1 - Existing Conditions Drainage Areas
- Figure 2 - Proposed Conditions Drainage Areas
- TSS Removal Worksheets

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Vanasse Hangen Brustlin, Inc.

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LEGEND	
	POND
	DESIGN POINT
	REACH
	DRAINAGE AREA DESIGNATION
	DRAINAGE AREA BOUNDARY
	TIME OF CONCENTRATION FLOW LINE
	100' BUFFER ZONE
	WETLAND BOUNDARY
	150' W.O.D. BOUNDARY
	300' W.O.D. BOUNDARY
	25' RIVERFRONT BOUNDARY

No.	Revision	Date	Appd.
Designed by	Drawn by	Checked by	
CAD checked by	Approved by		
Scale 1"=150'	Date May 15, 2008		
Project Title			

Assembly Square
Planned Unit
Development (PUD)
Assembly Square Drive
Somerville, Massachusetts
Issued for
Stormwater Management Report

Not Approved for Construction
Drawing Title

Figure 1
Existing Conditions Full
Build Project Drainage Areas

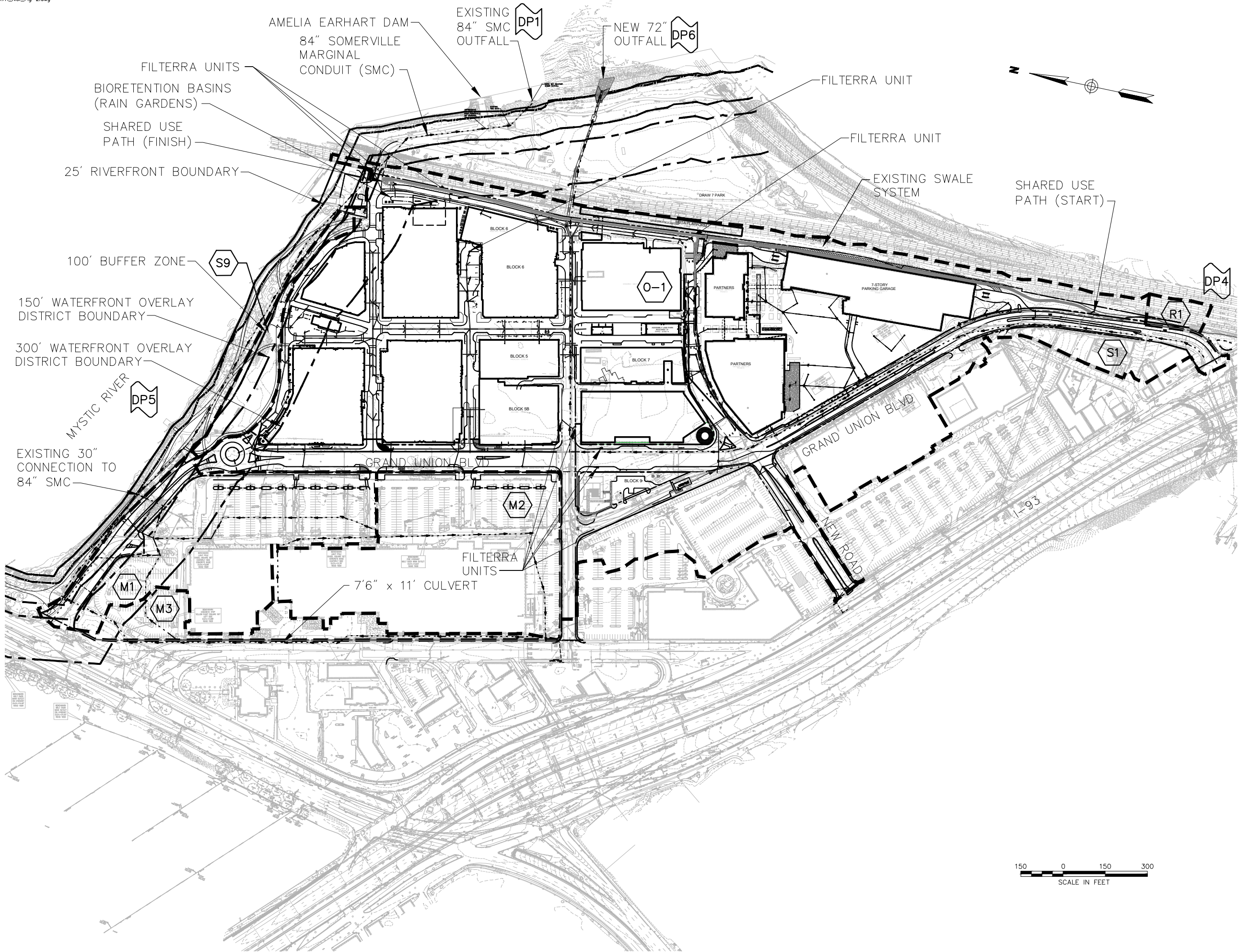
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Drawing Number

F-1

Sheet 1 of 1

Project Number
08518.05



LEGEND	
	POND
	DESIGN POINT
	REACH
	DRAINAGE AREA DESIGNATION
	DRAINAGE AREA BOUNDARY
	TIME OF CONCENTRATION FLOW LINE
	100' BUFFER ZONE
	WETLAND BOUNDARY
	150' W.O.D. BOUNDARY
	300' W.O.D. BOUNDARY
	25' RIVERFRONT BOUNDARY

**Assembly Row
Planned Unit
Development (PUD)**

Assembly Row
Somerville, Massachusetts

No.	Revision	Date	Appr'd.

Designed by	Checked by
Issued for	Date
Stormwater Management Report Not Approved for Construction	December 2, 2021

Figure 2
Proposed Full Build
Project Drainage Areas

Drawing Number



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TSS Removal Calculation Worksheet

Project Name: Block 7A
Project Number: 08518.05
Location: Somerville, MA
Discharge Point: DP-6
Drainage Area(s): Sidewalks & Roads (O-1)

Sheet: 1 OF 1
Date: December 2021
Computed by: JFB
Checked by: PTM

A	B	C	D	E
BMP*	TSS Removal Rate*	Starting TSS Load**	Amount Removed (B*C)	Remaining Load (D-E)
Stormceptor 450i***	80%	1.00	0.80	0.20
	0%	0.20	0.00	0.20
	0%	0.20	0.00	0.20
	0%	0.20	0.00	0.20
	0%	0.20	0.00	0.20

* BMP and TSS Removal Rate Values from the MassDEP Stormwater Handbook Vol.

** Equals remaining load from previous BMP (E)

*** Stormceptor sizing calculation gives a TSS removal rate of 94%. To be conservative, 80% removal is used for this calculation.

**Treatment Train
TSS Removal =**

80%

